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Research as a Career.

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Delivered at Twenty-Eighth Annual Meeting of
The Society for the Promotion of Agricultural Science, 1907.

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Research as a Career.

PRESIDENTIAL ADDRESS.

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In the address which I was privileged to present before this Society at its last meeting, I urged with such force as I might that the promotion of agricultural science is equivalent to the promotion, by such means as are at our command, of research in agriculture. I attempted to suggest some ways in which this Society might make its influence more largely felt in stimulating real scientific investigation of a high order and in enhancing the popular appreciation of the necessity for and the value of such investigation, to the end that it might receive the necessary moral and financial support.

The months which have elapsed since that time have but strengthened my conviction of the importance of such promotion of agricultural science. As the education of the American farmer progresses he is feeling less need for and less patience with elementary, superficial experiments and demonstrations. Useful as these have been in the development of our agriculture, their day is passing. Our institutions for agricultural research have entered upon the serious problem of extending and compacting our knowledge of the fundamental principles upon which successful practice must be based. Their work in the future, if they are to justify themselves, must be increasingly of a scientific and even abstruse character, and such research must be amply supported financially and must be allowed the time and continuity necessary to secure valid results,

That the public confidence in the ultimate outcome of scientific investigation in agriculture as undertaken in this country is great, and its future support assured, is clearly demonstrated by the rapidly increasing appropriations made

to it by both the national and state governments. The recent passage of the Adams Act, in particular, with its stringent requirement for the application of the fund to original investigation augurs well for the future. At the same time, it is equally true that the researches of any publicly supported institution must keep fairly close to the prospect of definite returns. There is a considerable range of abstract research, promising less immediate results, which can be cultivated only to a limited extent by such institutions. The endowment of the more recondite forms of agricultural research I still believe to be of the greatest importance in assuring ample time and security of support for work of this character, and I believe that such endowment will come, as it has for other lines of scientific inquiry. A subject of such fundamental sociologic and economic importance cannot long remain an exception.

Tonight I ask you to consider with me for a few minutes an even more important aspect of the problem of the promotion of agricultural science and one for which possibly the immediate outlook is not so hopeful. We all realize when our attention is called to the matter that the central factor in research is the man. Endowments, laboratories, appliances are secondary and exist and are useful only because and to the extent that they aid the man in his search for truth. This is an elementary conception but I fear we are all prone at times to lose sight of it. It is well to discuss methods of securing financial support for scientific investigation and means of impressing upon the public its importance, but in doing so we are inclined unconsciously to assume not only the present existence of an adequate body of investigators, but that their number like that of the operatives in a factory may be indefinitely increased as occasion arises. This seems hardly a rational procedure in view of the fact that the demands of this work are bound to increase. If we do not expect appropriations to grow by their own inherent energy, and if we undertake to study and improve the organization of agricultural research, is it not the part of ordinary prudence to take thought also for the training of the men who are to meet these increasing demands for agricultural investigation

and to replace those now active in the work? We have no cause to be ashamed of our investigators as a body, but should we not see to it that they have some spiritual progeny?

I raise, therefore, three questions: First—What should be the training of the investigator in agriculture? Second—What are the most effective means of acquiring this training? Third—Are the conditions surrounding research work in agriculture such as are calculated to attract qualified men to it and to induce students to engage in definite preparation for it?

These are large questions, of fundamental importance to the future of research in agriculture. He would be presumptuous, indeed, who should undertake to answer them on the basis of his own knowledge, and especially within the limits of one address, but the mere formulation of them may not be without its use. Certainly, it has seemed to some of us that the material basis of research has at present a tendency to outrun the supply of those qualified to utilize it, and that there are too many instances of mediocre men feeling about for subjects of investigation or taking up irrelevant or petty questions. If this impression be correct, the situation is a serious one and calls for prompt action to avert the danger of a collapse.

In considering these questions we must recognize at the outset that there are grades of research. I quote an already frequently quoted paragraph from the address of Dr. William H. Welch at the dedication of the buildings of the Harvard Medical School.

“On this creative side of university work men count for more than stately edifice and all the pride and pomp of outward life. Research is not to be bought in the market place, nor does it follow the commercial law of supply and demand. The multitude can acquire knowledge; many there are who can impart it skilfully; smaller but still considerable is the number of those who can add new facts to the store of knowledge, but rare, indeed, are the thinkers, born with the genius for discovery and with the gift of the scientific imagination to interpret in broad generalizations and laws the phenomena

of nature. These last are the glory of a university. Search for them far and wide beyond college gate and city wall, and when found cherish them as a possession beyond all price."

The occasional genius, however, may well be left out of our present consideration. Like St. Paul, who said of himself, "Necessity is laid upon me, yea woe is me if I preach not the gospel," so the genius in science is driven by an inner compulsion to search out the hidden things of nature. With this exceptional man the only question is how to make the conditions surrounding him such as to render his work most effective.

For most of us, however, a more modest rank must suffice. As Professor Cattell somewhat pathetically remarks in his discussion of American Men of Science, "Very few of those in this list of scientific men will be given posthumous consideration." Nor need this fact unduly sadden us. There are diversities of operations in the body scientific as in the body spiritual. The great bulk of the work of science in all departments is done by the plodding, faithful seekers after truth rather than fame, and the promotion of agricultural science depends after all quite as much on the patient, conscientious labors of the trained and competent investigator, each in his field, as on the occasional brilliant generalization of the exceptional man. Genius is heaven sent and we do well to reverence the gift of the gods, but talent we may hope to train and foster, and it is talent rather than genius on which we must depend for the work-a-day progress of our institutions for agricultural research.

1. What should be the training of the investigator in agriculture? Aside from that general training necessary to every educated man, there are, I think, two elements to be considered. The investigator in agriculture, if he be a real investigator, is a student of science. He is not a mere observer of nature or of practice; still less, one whose prime motive is the immediate application of his results to an increase of the profits of farming. He is not content with showing that variety A is better than variety B; with demonstrating that better balanced rations may save so many mil-

lion dollars yearly to the state; with showing that the productiveness of the soil may be increased so much by a certain system of farming. All these things may be well worth doing but it is essential that we distinguish, to quote the words of Dean Davenport, between research and "a good thing." The investigator is one who by impulse and by training seeks to go beyond these facts and to trace out the causes of phenomena, the hidden relationships which bind them together. It would seem self-evident then that the first requirement regarding the special training for such work must be that it be scientific. It should rest upon a broad and severe training in science, including actual work in research under the direction and inspiration of an experienced investigator. The student should not merely acquire a knowledge of the facts of science but should saturate himself with the scientific habit of thought and work. However practical the purpose of his future experiments, their methods must be scientific. This, of course, implies specialization, yet investigation in agriculture in particular covers such a broad field and is related to so many sciences that too early specialization should be avoided.

But while the first requirement of the agricultural investigator is this severe scientific training, it must not be forgotten on the other hand that his investigations are to be for the benefit of agriculture. The language of the Hatch and Adams Acts may well be our guide in this respect. Section 2 of the Hatch Act by necessary implication limits the legitimate work of our experiment Stations to "research or experiments *bearing directly on the agricultural industry of the United States,*" and Section 1 of the Adams Act employs the same language to qualify the original researches or experiments which may be undertaken under its provisions. However lofty the aim of the investigator, he must take care that his feet rest squarely and solidly on mother earth. Too many instances of futile effort on the part of the purely scientific man to serve agriculture are familiar to us all to require any special emphasis on this point. The object of the agricultural investigator is not the increase of knowledge for its own sake. Indeed, I confess to a doubt as to the worthiness

of such an ideal in any investigator. Let us by all means strive to increase knowledge, even of matters seemingly remote from practical concern, but let us do this, not for the mere satisfaction of mental curiosity nor for the increase of our own intellectual complacency, but because we are persuaded that in so doing we are rendering real even if unrecognized services to mankind. Certainly, the agricultural investigator in the United States is bound to see to it that his projects bear some definite relation to the actual problems of agriculture, which is by no means the same thing as saying they must have an immediate practical application. Plainly, then, the agricultural investigator must have an acquaintance with the practical problems and conditions of agriculture, as well as a training in the methods of science.

2. How may the prospective investigator in agriculture best acquire the necessary combination of scientific discipline and practical knowledge?

Our thoughts naturally turn in this connection to the agricultural colleges. Neither the conception of the agricultural college nor its function in the scheme of agricultural education are as yet altogether clearly defined. Historically, the purpose of the agricultural college has been to prepare men for the business of farming, and the success of these institutions is still largely judged by the general public from this standpoint. For the quarter century following 1862, practically the only idea of agricultural education that was in men's minds was that of a course at one of these colleges—these courses varying somewhat widely in character but being supposedly at least of college grade. In later years, our conception of the scope and methods of agricultural education has greatly broadened. We have successively added to the system secondary courses, trade courses (especially dairy courses), various forms of extension and demonstration work, and finally are making a beginning in providing for primary education in agriculture. While we still regard a collegiate education as desirable for the farmer, we nevertheless recognize that the ranks of educated practical farmers must be largely recruited from these other sources.

With this enlarged conception of agricultural education,

some change of emphasis in the agricultural college seems called for. As these other means of agricultural education develop, the function of the college will, I am convinced, tend more and more to become that of the training of leaders—owners or managers of large estates, public agricultural officials, teachers, and not least, investigators. That all these need special training in addition to that which may suffice for the practical farmer will not be disputed, and it seems to me equally indisputable that the agricultural colleges should supply this training, but there has seemed to be a certain degree of hesitancy on the part of the colleges to recognize this as their special field of work. They are passing through a transition stage and the traditions of the past are still powerful, while they are perhaps peculiarly subject to the temptation that besets all technical education to sacrifice ultimate power to immediate efficiency.

In its relation to the undergraduate training of the future investigator, the question is largely one of the quality of the training given by these institutions. They unquestionably familiarize their students with the practical aspects of agriculture and so furnish to a good degree one of the two elements required in the investigator, but how far do they impart to their graduates the spirit and temper of the investigator? Here again we must take account of conditions as they exist. Agriculture as a discipline is a comparatively new subject. Much has been done within the recent past to bring it into pedagogic form, yet large portions of it are still of necessity taught as information subjects. This seems unavoidable under present conditions, yet it has its unfortunate effects upon the student, which are only partially minimized by his training in the sciences related to agriculture. One of the most urgent needs in the training of investigators is greater emphasis upon the teaching of the science of agriculture to undergraduate students, and this again can be fully efficient only as the foundations of that science are broadened and deepened by the labors of the investigator. I make these comments in no pessimistic spirit. Our agricultural colleges are doing, on the whole, admirable work, and if they can avoid too great emphasis upon the practical applications

of science, their graduates should furnish our chief supply of agricultural investigators.

No one expects, however, that the average baccalaureate will be a qualified scientific investigator in more than the most limited sense. His time has been fully occupied in laying the foundations and he is just ready to begin his real training for research, which must be essentially graduate training. Hitherto, the function of graduate instruction has been but slightly developed in our agricultural colleges and their condition in this respect has been fitly characterized by Prof. Bailey as "Headless." In the past, graduate training in agriculture, except as it has been secured in foreign institutions, has been gained chiefly in the actual prosecution of research in our experiment stations and departments of agriculture. We have been practicing an apprenticeship system. Agricultural research in this country has grown with such tremendous strides that every graduate showing fair promise of ability in this direction has been eagerly caught up by these institutions. Almost as an incident, and without distinct purpose or plan on their part, they have become our agricultural university and their assistants have been our graduate students. Where those in charge of the work have been themselves thoroughly trained scientists, the method has worked fairly well, but in the rapid expansion of the work of research, very responsible positions have perforce been filled by men whose scientific training was not of the highest grade, however great their practical qualifications. In such cases it has been natural that the scientific training of the assistant should be more or less inadequate and the results have not always been the most fortunate. The time will soon come, if indeed it be not already here, when the provision of adequate graduate training in agriculture must engage our serious attention. It is a most hopeful sign of the times that the Association of American Agricultural Colleges and Experiment Stations has definitely assumed the responsibility for the continuance of the Graduate Summer School of Agriculture, and the relatively large attendance at both the sessions of that school shows that the need for graduate study is widely felt. It is a very promising beginning, yet only a be-

ginning. Even its most ardent advocates or those most intimately associated with its development would not for a moment claim that it can fully meet our fast coming needs or supply that systematic training in investigation which is requisite if the personnel of our research institutions in agriculture is to reach the degree of efficiency demanded by the problems of the future. It seems to your speaker high time that the stronger colleges began the earnest consideration of the question how the services of the many talented and able men in the faculties of our agricultural colleges may be brought to bear on the post-graduate education of our future investigators, not merely for a week or two at a summer school but in the daily work of laboratory and seminar. A present difficulty, of course, lies in the somewhat limited number of students in any one institution desirous of such opportunities, yet it would seem that a system of inter-university credits for work done, with perhaps the occasional exchange of professors, might help to meet the difficulty.

Naturally such graduate work, if undertaken, will at first be closely affiliated with the experiment stations, yet there is a certain distinction. The first duty of these public institutions for agricultural research is to produce results. They are conceived and organized primarily for this purpose and not for graduate instruction, and while the latter in the large view is perhaps quite as important as the former, in any conflict of obligations it must give way. Under conditions as they exist today, I am inclined to the belief that it would be to the great advantage of our future research work if as many as possible of those contemplating entrance upon it were to spend such time as they could at a non-agricultural university, where research is carried on with a more distinct view to its influence in training the student and where a changed atmosphere and conditions, and contact with diverse lines of investigation, tend to give the student a broader outlook. If his interest in and sympathy with agriculture are so weak as to be dissipated by such contact with university life, his value to the cause of agriculture in any case is questionable. If such a course is impossible, then let the student seek a position under some competent investigator, where he can take part in and

imbibe the atmosphere of research, and let him regard this as part of his post-graduate training and if necessary pay the price by accepting a low salary for a year or two. The experiment stations should count it part of their duty to encourage such training by giving preference to such men in their appointments.

3. Are the conditions surrounding research work in agriculture such as are calculated to attract qualified men to it, and to induce students to engage in definite preparation for it?

As I see it, three requirements must be met.

Perhaps the most important of these is the prospect of opportunity for independent work involving both responsibility and credit for results. Naturally the young assistant must usually begin in a subordinate position. This is both unavoidable and healthful. In the execution of any considerable scientific undertaking, a certain amount of routine work must necessarily be done. Weighings must be made day after day; measurements must be taken; plots must be inspected; bacteria must be counted; chemical analyses must be executed; data must be recorded and computed. These are the stones with which the structure of research is built up, and unless they be quarried from the enduring rock, and laid four-square to the winds of heaven, there is danger that the whole edifice may come tumbling about our ears. Much of this work naturally falls to the man occupying a subordinate position, nor should he object to this. On the contrary, it is a valuable discipline to him. He is learning to use the tools of his trade; he is seeing how these separate items are organized and marshaled in the attack upon the problem under investigation.

No one who has been responsible for the organization of such an undertaking, however, can fail to recognize that the necessity for routine work brings with it danger. There is a strong temptation to organize the investigation on what may be called the factory system; to assign to each man some one class of duties in which he may become perfect by repetition, and to make assistants and appliances alike simply cogs in the

machine for turning out scientific results; and the temptation is perhaps the greater, the more efficient the organizer and the broader his grasp of the problem. But such organization, while perhaps the most efficient as regards quantity of work and well adapted, for example, to the execution of control analyses, must utterly fail to develop that *esprit de corps* which is essential in investigation and in the end must seriously affect the quality of the work. Team work is as requisite in research as in athletics, and not the least of the duties of the captain is to make each man feel that his work, however humble and monotonous, is an essential and integral part of the whole. To the extent to which this can be accomplished, routine ceases to be drudgery and the worker becomes alert to bring his contribution to the whole as near perfection as possible.

But the beginner in research should see before him a prospect of something better than routine. As he acquires experience and power, there should open before him the possibility of attaining a position of higher rank and greater responsibility. While it is true that at present there is no lack of opportunities for competent men, nevertheless, this is a point which may well be born in mind in considering problems of organization. The tendency of the present time seems to be toward relatively large and highly organized agencies for agricultural research. From the point of view of administration this is a natural tendency, yet from the point of view of research it may have unfortunate consequences. If the head of the organization be himself an investigator his time and strength tends to be withdrawn more and more from his highest work to the problems of organization and propaganda. On the other hand, if the head of the organization be an administrator pure and simple we run into the opposite danger of a lack of sympathy with the viewpoint of the scientific investigator and of a more or less bureaucratic organization. Administration, of course, we must have. On the other hand, the real investigator must be close to his work and able to give it the major share of his time and strength. It is as true in science as in religion that no man can serve two masters. Without attempting any dis-

cussion of the administrative side of the question, I am strongly of the opinion that each group of workers undertaking a definite field of research should in some way be allowed a large degree of independence in their operations with of course the corresponding responsibility which can only come with freedom. How this may be best combined with a proper coordination of all the lines of work of an experiment station, for example, and with effective financial administration, is a question lying outside the scope of this address.

A practically if not formally autonomous organization of a limited line of research would seem to hold out distinct advantages to the younger workers. Such an organization is likely to comprise comparatively few individuals, who are brought into close personal touch with each other and with their chief. The latter, if he grasps his opportunity, will be far less the director than the inspirer of the work. In such an organization the formal bonds of authority rest lightly, or give place to the comradeship engendered by the pursuit of a common object. Not only do such conditions lighten the burden of routine work, but in the stimulating atmosphere of research the powers of the subordinate have every opportunity to develop and manifest themselves. In short, it is in this way that the university function of the research institution is most effectively performed and the training of the young worker in the method and spirit of scientific investigation most rapidly advanced. Our agricultural colleges will do well to consider whether liberally supported departments of real, fundamental scientific research will not be of the highest value from the educational standpoint in furnishing graduate training for students in addition to their importance in building up agricultural science. Moreover, a decentralized organization of research, while not perhaps increasing the number of positions to be filled, nor diminishing the amount of routine work to be done, does increase the number of virtually independent and responsible positions. Considerations of formal organization should interpose as few obstacles as possible to the development of the individuality of the promising investigator. This is the soul of research; the organization but the body.

Another condition, closely related to the above, which must be fulfilled, if research in agriculture is to be made permanently attractive to able men, is what we may call in a somewhat extended sense academic freedom. The competent investigator should be responsible for his mature scientific conclusions primarily to his own conscience. Crudeness and haste may perhaps tend to mark the work of the young investigator, but under any wise and judicious administration these failings can easily be remedied, and their overcoming made a part of the training of the man, with no sacrifice of freedom. Premature and sensational publication and the search for newspaper notoriety, are of course to be deprecated and if necessary suppressed, but anything like suppression of results because they do not accord either with supposedly established views or with preconceived notions of a superior officer is not only fatal to the interests of research itself but likewise to the supply of competent investigators. No man with the true spirit of the investigator will consent to accept a position in which the results of his investigations are prescribed in advance.

I am glad to believe that there is comparatively little of this spirit in our institutions for agricultural research, and that the cases are rare in which any sane and well considered conclusions are not assured of a hearing. Indeed, I am inclined to believe that our danger lies rather in the opposite direction; in the too ready acceptance of novel or striking conclusions, and the lack of adequate criticism and discussion of results announced. It is a necessary corollary of the doctrine of freedom of investigation that there shall also be freedom of discussion, and that if a man's scientific utterances are not dictated by his superior officers neither shall he expect to be defended by them from the critical judgment of his scientific peers. I am not now referring to personal attacks, or the impugnement of scientific or professional veracity, but to the deliberate, objective judgment of experts upon the quality of a man's work and the validity of his conclusions. If he cannot justify himself before this tribunal, he should not cry to Jove for help. One of our most serious deficiencies at the present time is the lack of a suitable medium for the judicial

criticism—just and appreciative, but also unsparing—of publications in agricultural science, but it is far easier to see the difficulty than to devise a remedy.

Finally, we have to inquire what rewards research in agriculture offers. First, there is the question of the pecuniary rewards. No one under present conditions expects the work of research to be brilliantly successful financially. While science is coming to be more and more largely recognized as lying at the basis of our material civilization, it is still the inventor, rather than the investigator, who reaps the large pecuniary rewards. The investigator, however, may fairly claim a living wage, and this means, in his case, not simply provision for his physical needs but for his mental growth as well. He must have books. He must maintain membership in learned societies, and attend their meetings. He must, if possible, travel. He must maintain a style of living measurably comparable with that of the classes of society into which he is naturally thrown. He may even wish to rear a family.

In the hope of obtaining some data regarding the actual compensation of agricultural investigators in this country, which might be, at least, suggestive, I have addressed inquiries on the subject to the directors of all the experiment stations. Thirty-seven of these have been kind enough to reply, more or less fully, to these inquiries. The questions related to the salaries paid to the scientific staffs of the Stations, excluding, on the one hand, the director, whose salary is presumably determined, in part, by his executive ability, and, on the other hand, those persons whose duties are of a purely clerical or mechanical nature. They included college as well as station salaries. It is obvious that returns secured in this somewhat hasty and informal way cannot be regarded as in any sense authoritative, yet some of the results may not be without interest.

It appears that the average total salary of 509 individuals is \$1,442 per year. In the case of 489 of these, \$926, or 64 per cent of the whole salary, was paid by the experiment station. Somewhat more instructive is the range of salaries. The average salary of the thirty-seven persons reported as

receiving the maximum in their respective institutions was \$2,269. The average salary of the thirty-two persons receiving maximum Station salaries was \$1,605. The largest total salary in the list is \$4,000, paid wholly by an experiment station. The next highest total salary is \$3,450, while the next highest salary paid by an experiment station is \$2,600. The lowest salary in this list is \$1,020, the next lowest, however, being \$1,500. Turning now to the other end of the series, the thirty-six individuals reported as receiving the minimum salaries averaged \$667, and the twenty-nine reported as receiving minimum station salaries averaged \$642. The highest minimum salary in the list is \$1,200, while amounts as low as \$100 are reported, evidently covering only partial or temporary service. These figures confirm fully the general statement made to me by Director A. C. True, of the Office of Experiment Stations, in response to an inquiry, as follows:—

“The salaries of mature experts in our stations range all the way from a merely nominal sum, given for consultation services, or supervision of some limited investigation, up to \$4,000. Where an expert's service is wholly given to his college and station work and he has the rank of professor, but does not act in an administrative capacity, the salary ranges from \$1,500 to \$4,000. Salaries of \$1,800 to \$2,000 are quite common and represent what may be called the average. There is a general tendency to raise salaries, and \$2,500 is a much more common figure than it was a few years ago.”

Apparently, then, the young man looking forward to a career in agricultural research may expect to begin his service at a salary of from \$650 to \$700 per year, or if he is fortunate in his institution, may receive as much as \$1,200. It appears, also, that nearly all of this is likely to be paid by the experiment station. In other words, the figures confirm the general impression that it is the younger and less well trained workers who are employed exclusively, or chiefly, in station work. If an average young man, as he grows in experience and usefulness he may expect to reach the average salary of \$1,400 to \$1,500, by which time, however, something

like one-third of his energies will be demanded by the work of instruction. As he approaches the higher grades of the service, he may anticipate a salary of from \$2,000 to \$2,500, of which perhaps 40 per cent will be received for teaching work, while \$3,500 to \$4,000 appears to be the upper limit, with the exception of a comparatively few more highly paid executive and administrative positions.

On the whole, these data seem to indicate that the work of investigation in agriculture is paid much on the same scale as the work of instruction in our colleges and universities, although naturally no exact comparison is possible. The weak point appears to me to be the comparatively small salaries paid in the lower grades of the service. With the growing call for men in other lines of agricultural and scientific work, the stations are in serious danger of finding their lower ranks filled with the "culls" of our agricultural graduates.

Naturally few things are less satisfactory than a discussion of the proper compensation for professional or similar services. There are few of us I presume, who are quite sure that our abilities are as fully recognized pecuniarily as they should be, or who could not find many uses for even a small advance in salary, while, on the other hand, there are few of us who, if compelled to do so, could not subsist on less than we are now receiving. Commercial standards are not altogether applicable, yet this much may safely be said, that if the work of research in agriculture is worth doing at all it is essential that its money rewards be sufficient to prevent the pressure of pecuniary needs from forcing capable and competent men into other lines of work, a tendency which has not been entirely lacking in recent years.

But the pecuniary rewards of research, like those of any other career, are or should be secondary. The man who simply works for his wages is equally to be commiserated, whether his work be in business, in science or industry; whether his wages be measured by dollars or by millions. To the man of high ideals not a small part of the attraction of a career of successful research lies in the very fact that its

largest rewards are immaterial. Leaving out all questions of pecuniary recompense, or of possible fame, the rewards of the searcher after truths are large. The satisfaction of worthily exerting worthy powers is after all one of the highest pleasures which most men can enjoy. He who can feel as he nears the end of life that his work has been of real service, however humble, to mankind—that he has assisted in building up instead of tearing down—can look toward the end with confidence.

Such satisfaction, it seems to me, is peculiarly the share of the agricultural investigator at the present time. This country seems to be just beginning to realize the tremendous sociological importance of rural life, nor do I believe it a mere chance that this development is so largely coincident with the development of agricultural science. While the beginnings of agricultural research in this country date back to the 50's, and while a notable increase of interest in it followed the establishment of the first agricultural experiment station in 1875, it was by the enactment of the Hatch Act, twenty years ago last March, that the United States definitely committed itself to the policy of promoting research in agriculture. The far-reaching effects of that act are becoming increasingly apparent, and by no means the least of these is the stimulus which it gave to agricultural education. The recent surprising growth of the agricultural colleges, and the still more recent development of secondary and primary agricultural education, all date substantially from 1887. Beginning with a keen appreciation of the material benefits accruing to technical agriculture from the investigations of the scientist, as demonstrated by the work of the experiment stations, this movement, while losing none of its practical character, is steadily broadening its scope. We are gradually coming to see that the function of science in relation to agriculture is not simply to perfect its technic and enhance its profits, but that its ultimate aim is nothing short of the uplifting of the whole body of the agricultural people. That this uplift began with the improvement of the physical conditions of farming is but a repetition of the experience of the ages. That it has so soon begun to take on the broader as-

pect is cause for profound satisfaction. Those who have aided, however humbly, in this advance may well feel that this fact is their chief reward, while the breadth and significance of this movement for the advancement of agriculture should appeal with tremendous force to the generous soul of youth. He who may reasonably hope to promote by his researches this vast movement need seek no further for a worthy career.





